The Future of C4ISR…and FORCEnet

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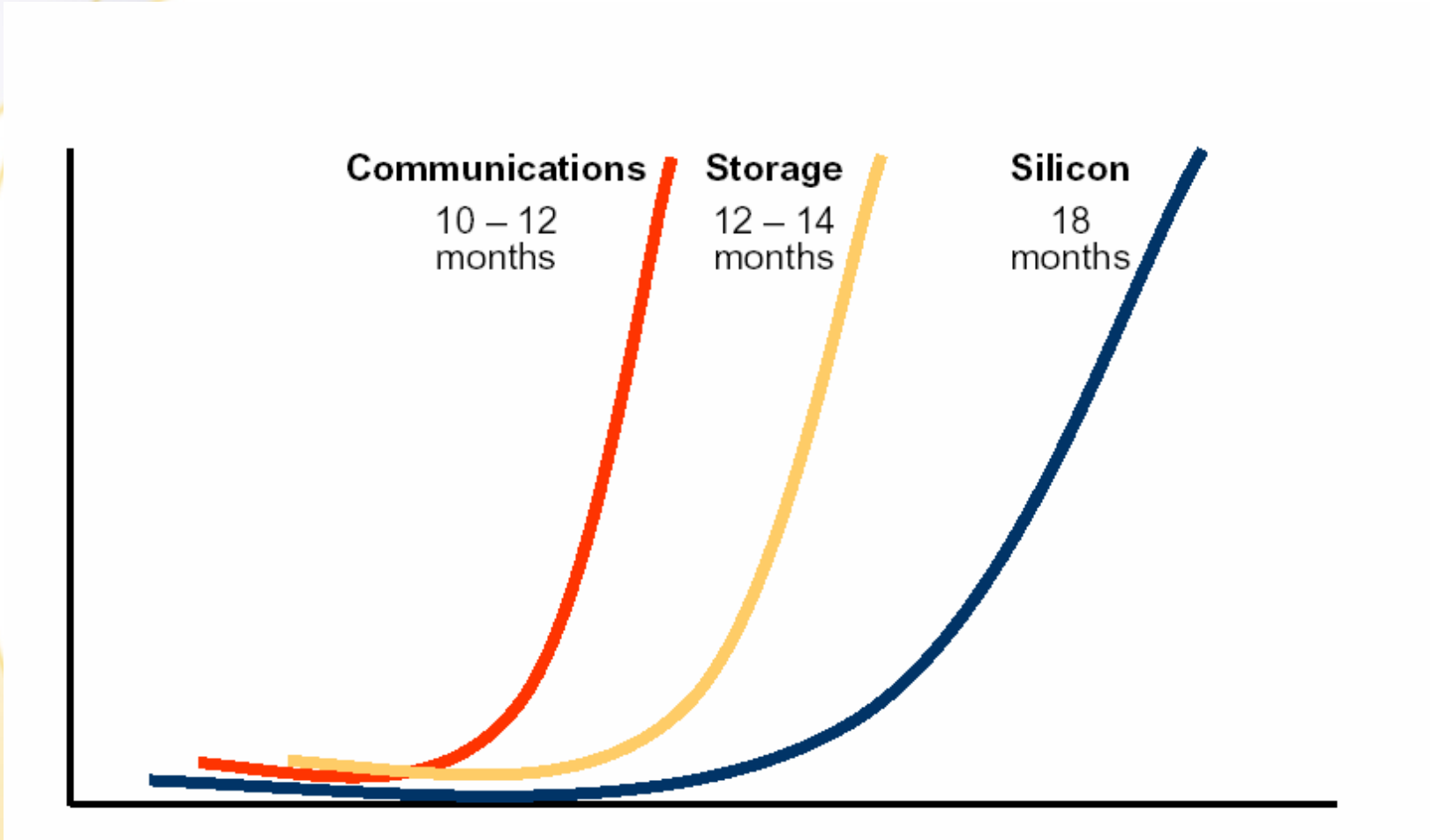
- "…the operational construct and architectural framework for naval warfare in the Information Age, integrating warriors, sensors, command and control, platforms, and weapons in a networked, distributed combat force." [CNO SSG]
- The network, and underlying architecture, are agile and flexible
- The nodes
  - Sensors
  - Weapons
  - C2 decision-makers
  - Platforms…
- Can **we** get there from here?

Where is commercial IT taking the world? And maybe Fn...

- Moore's Law—computing capability (number of transistors on a CPU) doubles every 18-24 months
- Storage Law—storage capability doubles every 12-14 months
- Gilder's Law—bandwidth capability doubles every 10-12 months
- Metcalfe's Law—value of a network grows with the square of the number of users (n), n^2 (alternatively, nlogn or 2^n (Reed's Law))

Three exponential growth curves



Corollaries of these Empirical Laws

- Size and weight of a given processing device are DEcreasing at the exponential rate of Moore's Law
- Size and weight of a given storage device are DEcreasing at the exponential rate of the Storage Law
- Time required for moving the same data is DEcreasing at the exponential rate of Gilder's Law

What **can** this mean for C4ISR and Fn?

- Ubiquitous sensing
- Distributed computing/(pre) processing
- Smart networks
  - mesh and beyond
  - true plug and play
- Distributed weapons and control
- “The network is the weapon” (VADM McArthur)
- Beginnings: TNT experiments at NPS

Technical Needs

- Power for portable/mobile nodes/motes
  - Batteries
  - Solar
  - Whatever?
- Security ⇔ Interoperability (integrating interests!)
  - Layer 1, 2, or even 3 of OSI model are not sufficient approaches
  - Layer 7, or object-level, security needed:
    - Metadata
    - XML Sign/Encrypt
    - Type 1 certification from NSA
    - GCCS/JC2(S) as good first example: contact/track-level security
- Microsecond-capable sensor/weapons control (IP?) subnets
  - These are essentially “transactions”
  - If eBay and Amazon can do it worldwide, why can’t we? Even with mobile nodes!?

Process/Policy Needs

- Open Architecture (finding common ground!)
  - Open standards
  - Open system architecture
  - (Open) services-oriented architecture (SOA/ESB)
  - If done right, technical and architectural issues can be worked in parallel
- Beginnings
  - PEO(IWS) Open Architecture initiative (NPS participation)
  - FORCEnet Engagement Packs (NPS thesis) as set of empirical, mission-oriented requirements for “openness”
  - W2COG (NPS research)
  - NCOIC and W2COG Institute working together
- The DoD acquisition “system” needs reworking in a world of Moore’s/Gilder’s/Storage Laws

Thank you!

Questions at the Q&A session and the break